

ABSTRACT

5 The present invention relates to recombinant
human interleukin-3 (hIL-3) variant or mutant proteins
(muteins). These hIL-3 muteins contain amino acid
substitutions and may also have amino acid deletions at
both the N- and C- termini. The invention also relates
10 to pharmaceutical compositions containing the hIL-3
muteins and methods for using them. Additionally, the
present invention relates to recombinant expression
vectors comprising nucleotide sequences encoding the hIL-
3 muteins, related microbial expression systems, and
15 processes for making the hIL-3 muteins using the
microbial expression systems.

 Included in the present invention are deletion
mutants of hIL-3 in which from 1 to 14 amino acids have
20 been deleted from the N-terminus, and from 1 to 15 amino
acids 119 to 133 have been deleted from the C-terminus,
and which also contain amino acid substitutions in the
polypeptide. These hIL-3 multiple mutation polypeptides
may have biological activities similar to or better than
25 hIL-3 and, in some cases, may also have an improved side
effect profile.